DOCTORAL PROGRAMME CLIMATE CHANGE

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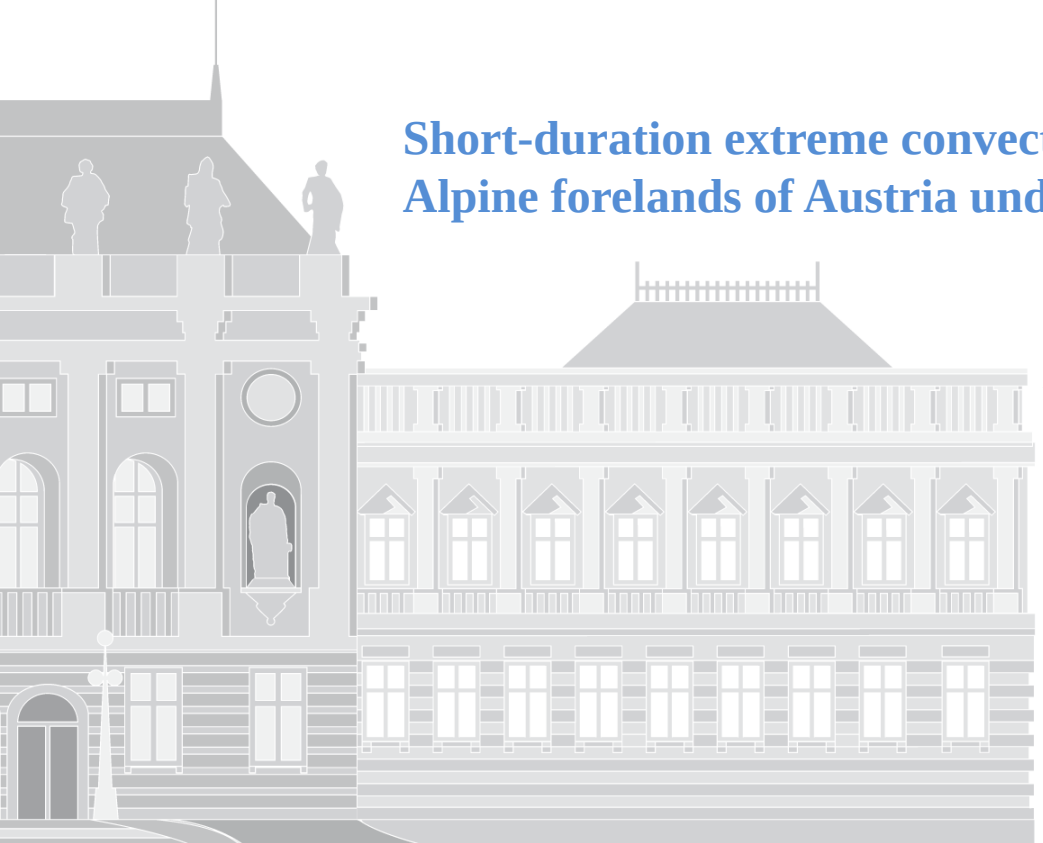

Short-duration extreme convective precipitation in the southeastern Alpine forelands of Austria under climate warming

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Mon 4th May 2020, 8:30-10:15h, Pres. No. D1944

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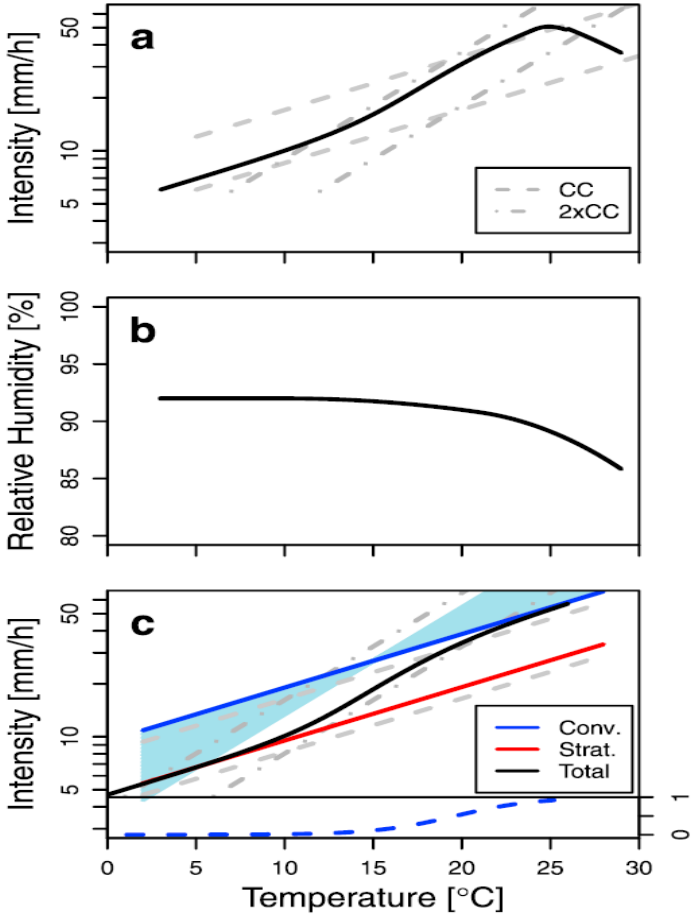


Figure 1. Conceptual diagram of the observed relationship between temperature and extreme rainfall intensity as understood from empirical studies. (a) The basic behavior of higher rainfall intensity percentiles (solid black line) with CC scaling (long-dashed black lines) below about 12°C, super-CC scaling (dot-dashed black lines) between 12°C and 24°C, and negative scaling for temperatures above 24°C. (b) Typical pattern of observed decrease in relative humidity for higher temperatures [*Hardwick-Jones et al.*, 2010; *Berg and Haerter*, 2013]. (c) The hypothesis [*Haerter and Berg*, 2009] of the super-CC scaling being caused by a shift from a stratiform (red) to a convective (blue) weather regime. The inset in Figure 1c shows the relative contribution of convective rainfall to total rainfall.

(Westra et al., RG, 2014)

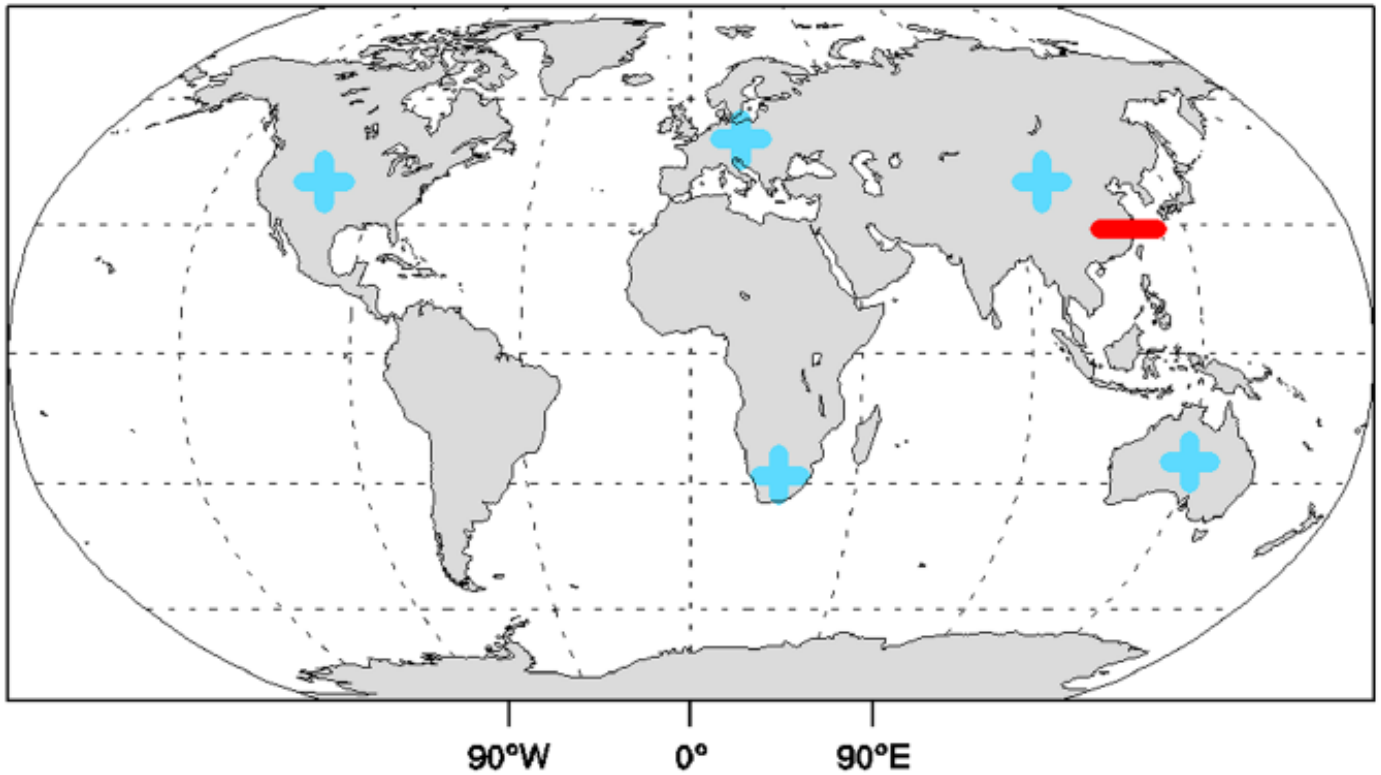
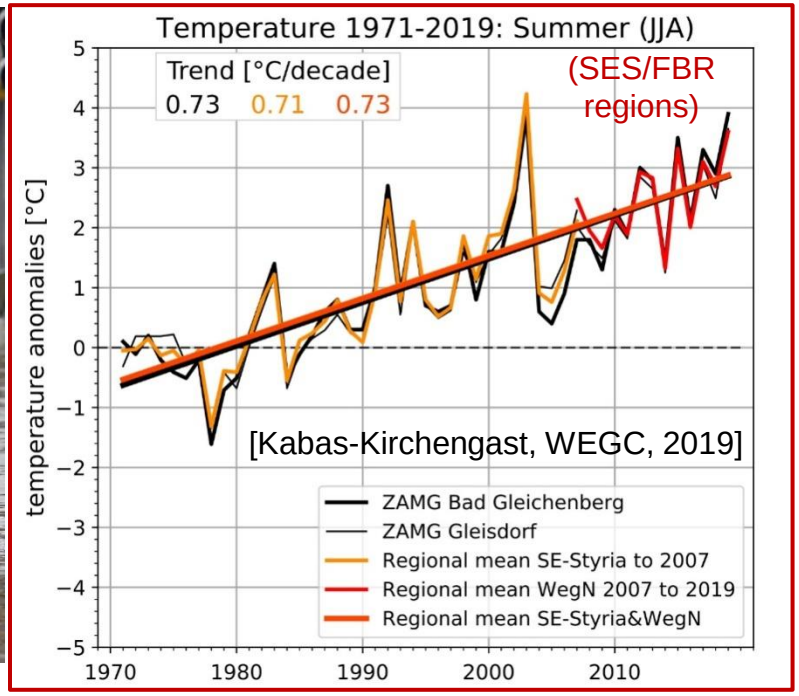
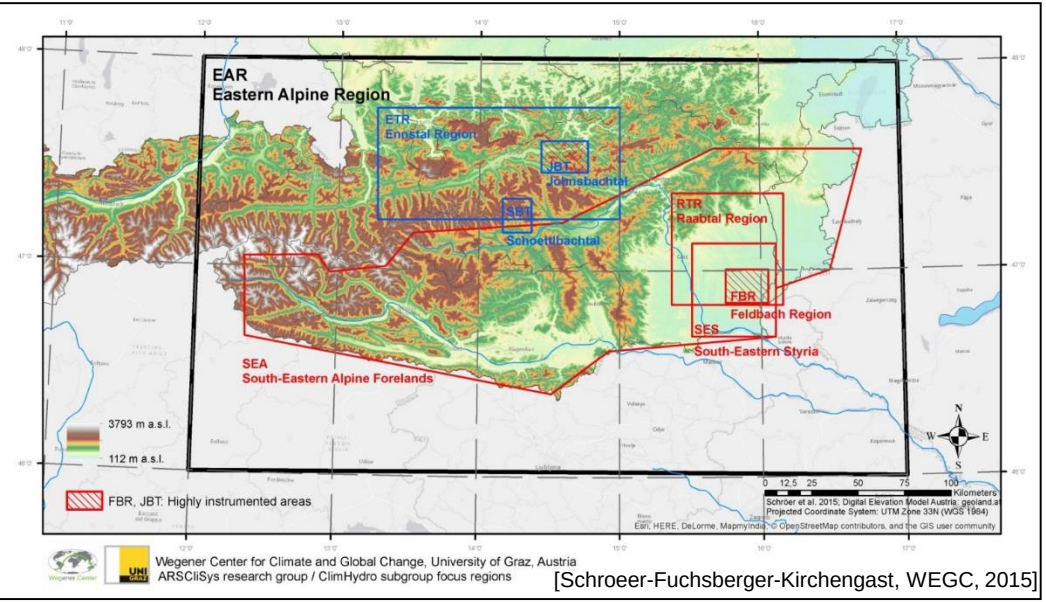


Fig: Synthesis of regional trends in sub-daily extreme rainfall. Increasing trends are showing with plus sign and decreasing trends with minus sign (Westra et al., RG, 2014)

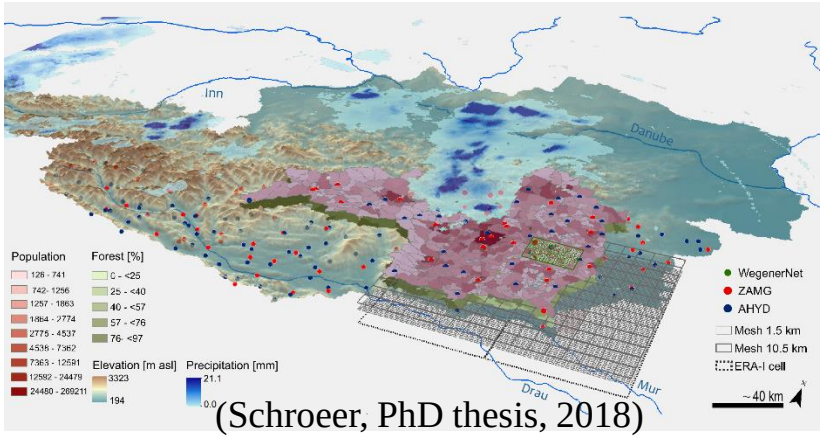
Background of the study – strong warming in and around southeastern alpine region



Background of the study – focus on study area EAR/RTR/SES/FBR



[Schroeer-Fuchsberger-Kirchengast, WEGC, 2015]



(Schroeer, PhD thesis, 2018)

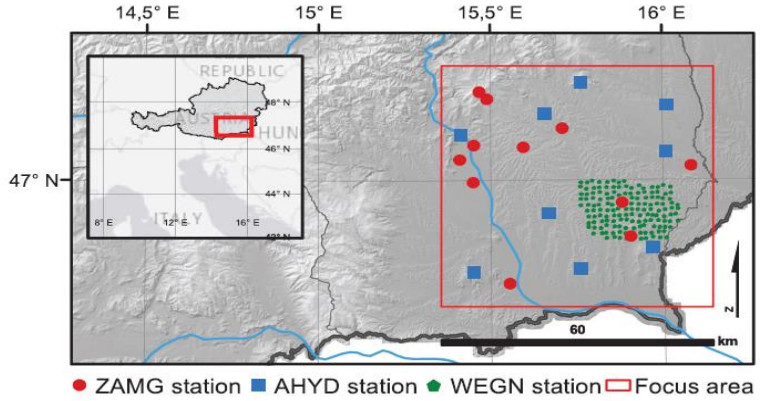


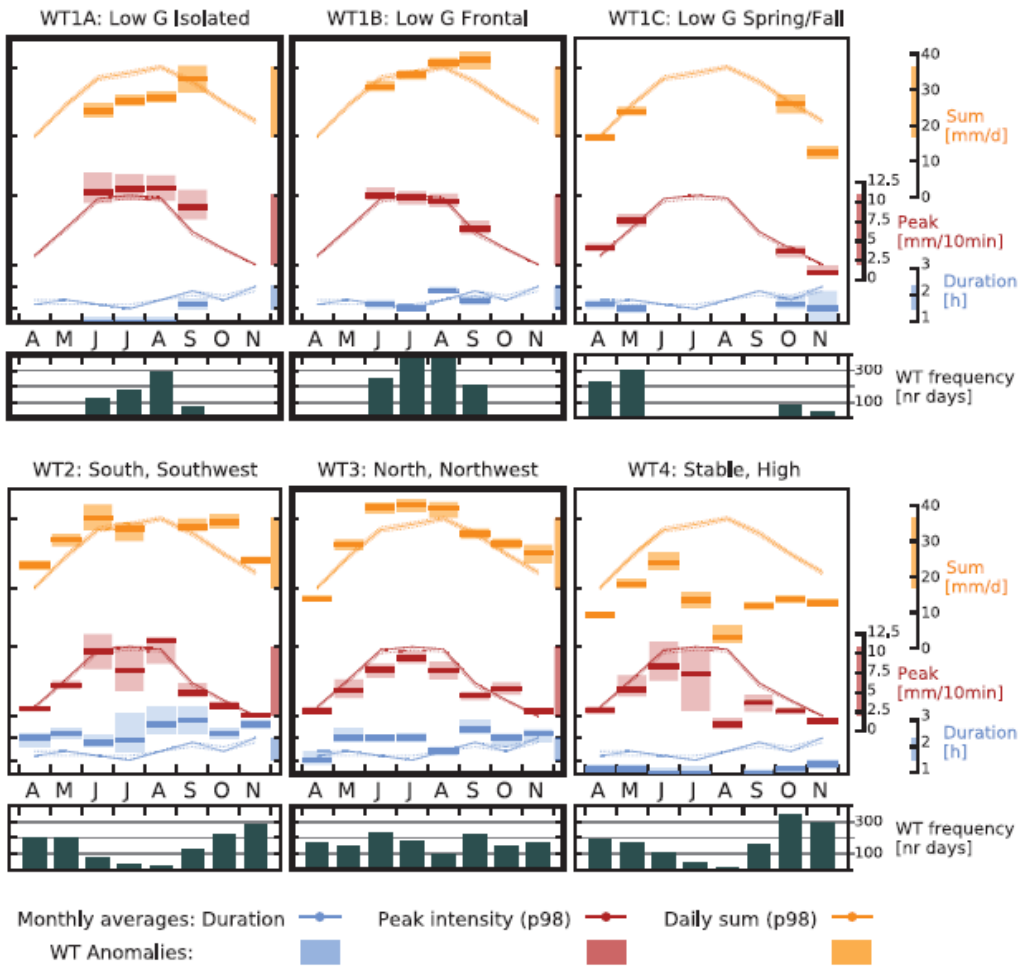
Figure 1. Study area and rain gauge locations in southeastern Austria. ZAMG = Austrian national weather service; AHYD = Austrian hydrographic service; WEGN = WegenerNet Feldbach Region.

(Schroeer et al., GRL, 2018)

Weather Typing

Weather type frequency (black bars, rows 2 and 4) and associated extreme precipitation (98th percentile, horizontal bars) for peak intensity (red), daily sum (yellow), and average wet spell duration (blue). Shadings show 90% confidence intervals. Full lines are identical in all panels and show the overall monthly climatological percentile values (full lines, dotted lines mark 90% confidence intervals).

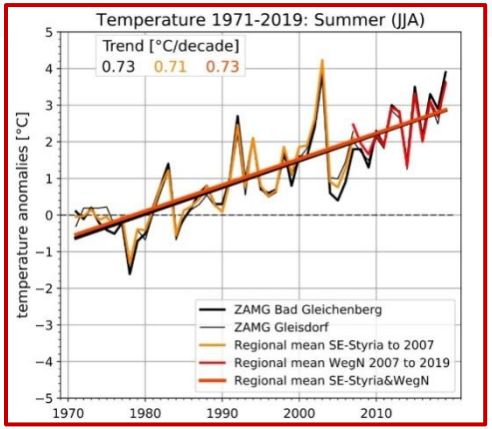
(Schroeer and Tye, JFRM, 2019)



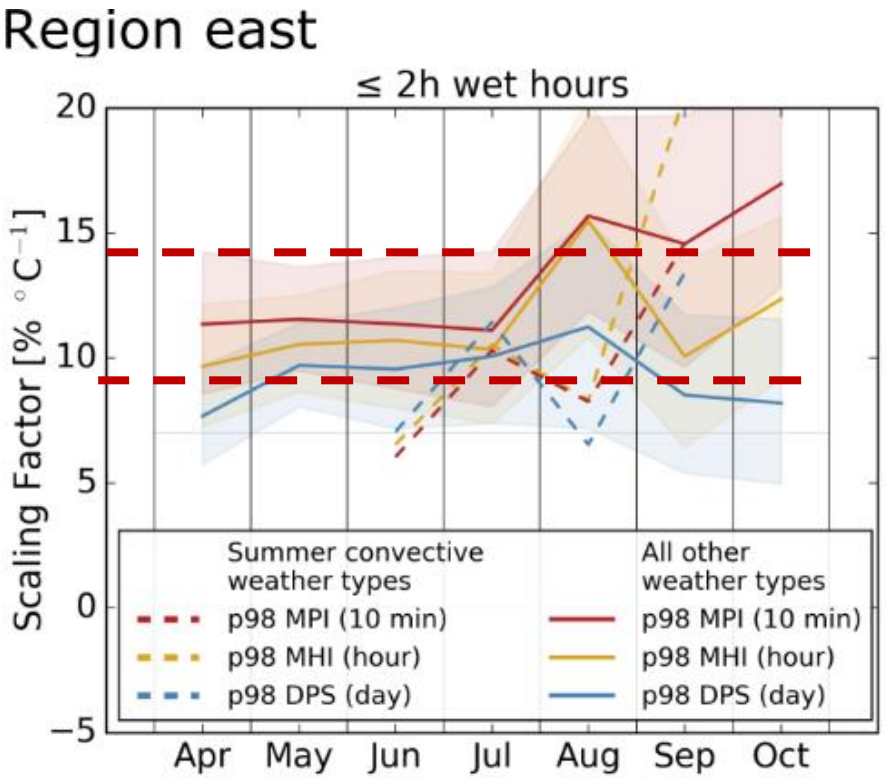
Southeastern alpine forelands of Austria: Recent climate research results

Shorter-lasting and local rainstorms become especially violent with increasing temperature

Around 9-14% increase in heavy rainfall intensity per °C in MJJAS (extended summer) instead of only around 4% for longer and more flat rainfalls



[Kabas-Kirchengast, WEGC, 2019]



(Schroeer and Kirchengast, CDYN, 2018)

References

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